



FUNCTIONAL ENDOSCOPIC SINUS SURGERY: A PROSPECTIVE STUDY OF 100 PATIENTS AT OUR CENTRE.

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ABSTRACT

Functional Endoscopic Sinus Surgery (FESS) is a highly advanced surgery, which has changed the face of the surgical management of chronic sinus diseases. In this prospective study, 100 patients with chronic rhinosinusitis of both sexes of age group 18-60 years are evaluated. All patients underwent preoperative nasal endoscopy and CT scan of nose and PNS. The Indications, techniques of surgery, intra-operative and postoperative minor and major complications are reported. The patients were followed up at 3 and 6 months. Postoperative results are analysed in these patients and 83% to 96% showed improvement in symptoms. No patient's symptoms worsened. We concluded that the surgery significantly improves disease-specific Quality of Life of patient.

KEYWORDS

chronic rhinosinusitis, nasal endoscopy, quality of life.

INTRODUCTION

Chronic rhinosinusitis (CRS) is defined as a group of disorders characterized by inflammation of nasal and paranasal sinuses mucosa for at least 12 consecutive weeks duration, either accompanied by nasal polyps or without nasal polyps.² The underlying cause of inflammation is multifactorial being bacterial, fungal, allergy, anatomic abnormalities, systemic diseases (endocrine, metabolic, genetic) and noxious chemicals.¹ Optimal conservative management includes 2-6 weeks of adequate antibiotics alongwith treatment of any concomitant disease. Cases refractory to the aforementioned optimal conservative management are subjected to endoscopic sinus surgery as a reasonable alternative to continuous medical treatment.^{1,2,4}

FESS is a minimally invasive dissection technique in which the paranasal sinuses ostia and the air cells are opened under the visual guidance of an endoscope and inflamed unhealthy mucosa is removed to restore the ciliary transport mechanism and mucous clearance pathway.⁴ The major drainage pathways for maxillary, anterior ethmoids and frontal sinuses are located in the osteomeatal complex and its obstruction is the root cause for chronic sinusitis. It is now known that re-establishing the ventilation of the sinuses by Opening of stenotic ostia, the so called irreversible mucosal changes revert back to normal.^{5,6}

Based on these principles coupled with the technological development of endoscopes, increased understanding of the anatomy via CT scans, and image-guided surgery has revolutionized the management of chronic inflammatory sinus diseases.⁷

MATERIALS AND METHODS

Total 100 number of patient are enrolled for the study. The prospective study is conducted on the patients admitted in the Department of Otorhinolaryngology, Mahatma Gandhi Medical College & Hospital, Jaipur from January 2016 to July 2017.

Inclusion Criteria

- Chronic rhinosinusitis diagnosed according to European position paper on rhinosinusitis and nasal polyps (EPOS) 2012.³
- Characteristic changes in pre-operative computed tomography of paranasal sinuses assessed according to EPOS 2012.³
- Chronic rhinosinusitis patients with or without nasal polyps who have not improved after atleast 3 months of medical treatment.

Exclusion Criteria

- Other subgroups of CRS/ Secondary CRS.
- patients under 18 years and above 60 years
- Pregnancy;
- Immunodeficiency, patient with chronic ailments like uncontrolled diabetes mellitus/ asthma/ epilepsy and bleeding diathesis.

- Patients who encountered revision endoscopic sinus surgery
- Patients having neoplastic disease of nose and paranasal sinuses

A detailed medical history is taken alongwith local and general clinical examination. All patients are subjected to diagnostic nasal endoscopic examination to examine the overall nasal cavity and findings are recorded. Non contrast computed tomography (CT) scan of nose and PNS are conducted in every patient.

SURGICAL PROCEDURE

FESS is performed under general anesthesia. Karl Storz 0°, 30°, 70° angle endoscope with diameter of 4mm are used. The patient's nasal cavity is packed with 4% xylocaine with adrenaline cotton pledgets for about 15-20 minutes for adequate nasal decongestion. For infiltration anesthesia 1% lidocaine with epinephrine 1:200,000 is used.

If there is any polyp in middle meatus or nasal cavity then it is removed partially without pulling with the help of Xomed Microdebrider IPC. In patients without nasal polyps the first step of the operation is to do an uncinctomy / infundibulotomy.

The uncinate process is resected using a sickle knife. The maxillary sinus ostium is identified and widened using back bitter punch forceps. Proper examination of the sinus is done with 30° or 70° endoscope.

The Bulla ethmoidalis is then identified and its dissection is undertaken using straight blakesly forceps. The posterior ethmoid air cells and the sphenoid sinus are opened only if the CT scan indicates any disease in them⁸⁵. Frontal recess widening is done only in those patients in whom the CT scan showed involvement of frontal recess and sinuses.

At the end of the surgery, both nasal cavities are packed with Merocel 8cm packs to stop bleeding and act as a tamponade; which are removed on 3rd postoperative day.

RESULTS

Male patients are found to be more affected and symptomatic than female patients between the age group of 20-60 yrs. The mean age of the patients affected is 35.4 ± 11.2 yrs in this study. (table 1)

Preoperative symptoms are depicted in figure 1. Nasal obstruction is the most common symptom (83%).

Table 1: Demography Of Study Population

Total number of patients		100
Male	58	58%
Female	42	42%
Age wise distribution of study population		

Age group in years	N	Percentage
<20	4	4%
20-29	34	34%
30-39	25	25%
40-49	24	24%
50-60	13	13%
Mean±SD	35.4 ± 11.2 years	

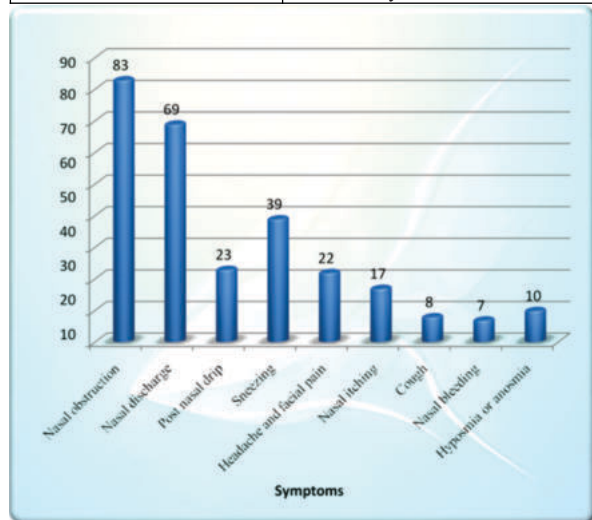


Figure 1: Clinical Presentation Of Study Population

The duration of symptoms range from 6 months to 15 years. Mostly the patients affected have symptoms from 3-6 yrs. The mean age of symptoms is 3.7±2.5 yrs. There are only two patients with symptoms ranging from 12-15 yrs.

The diagnostic nasal endoscopic findings are listed in table 2.

Table 2: Diagnostic Nasal Endoscopic Findings

Endoscopic Findings		No. of cases	%
DNS/spur		82	82
Uncinate Process	Prominent	23	23
	Recessed	7	7
Middle Turbinate	Hypertrophy/ Concha bullosa	23	23
	Paradoxical	9	9
Bulla Ethmoidalis	Prominent	27	27
	Recessed	12	12
B/L ethmoidal polyps		29	29
Antrochoanal polyp		21	21

After medical management, all patients underwent CT scan of nose and PNS. The findings are listed in table 3.

Table 3: Preoperative CT Scan Findings

Findings		No. of cases	%
DNS/spur		82	82
Maxillary sinus opacification		92	92
Ethmoidal opacification		54	54
Frontal opacification		28	28
Sphenoidal opacification		15	15
Osteomeatal complex block		55	55
Haller cell		10	10
Concha bullosa		23	23
Paradoxical middle turbinate		9	9
Agger nasi prominence		17	17
Onodi cells		4	4
Kero's classification	1	23	23
	2	74	74
	3	3	3

Table 4 lists the operative procedures performed. Majority of the patients underwent Uncinectomy (UN) and middle meatal antrostomy (MMA). As required, procedure is done unilaterally or bilaterally. In present study 44% patients had unilateral procedures and 56% having B/L procedures done. In majority of patients to facilitate approach to the sinus pathology and for ease of post-operative suction

clearance and saline douching, septal deviation, concha bullosa, turbinate hypertrophy were corrected.

Table 4: Surgical Procedures, Broken Down By Specific Component As They Were Performed On Study Population

Surgical procedures		n	%
UN + MMA	U/L	17	34
	B/L	17	34
UN + MMA + AE	U/L	22	39
	B/L	17	39
UN + MMA + AE + PE	U/L	1	9
	B/L	8	9
UN + MMA + AE + PE + SO	U/L	1	7
	B/L	6	7
UN + MMA + AE + PE + SO + FS	U/L	0	8
	B/L	8	8
UN + MMA + AE + PE + FS	U/L	0	3
	B/L	3	3
Septoplasty		82	82
Conchoplasty		23	23
Wedge resection of middle turbinate		6	6
Submucosal diathermy	U/L	2	14
	B/L	12	14
Partial inferior turbinectomy	U/L	2	6
	B/L	4	6

AE- Anterior Ethmoidectomy, PE- posterior ethmoidectomy, SO- sphenoidotomy, FS- frontal sinusotomy

The surgeries are uneventful and no major intraoperative complications occurred. Two patients develop periorbital swelling which subsided after removing of intranasal packing. The patients are strictly called for the post operative followup. At every follow up nasal endoscopy is done to remove clots, crusts, mucopus. Four patients develop synechiae between upper part of middle turbinate and lateral wall of nose, two patients develop synechiae between nasal septum and inferior turbinate, 1 patient has synechiae between middle turbinate and lateral wall of nose; which are released. Excessive crusting on initial follow-up is present in 20 patients and is present in all six patients in whom turbinectomy is done. On 12 week follow up, all patients were relieved of crusting.

In presented study, majority of patients reported significant improvement in quality of life after FESS for CRS. Two patients had their symptoms unchanged even after surgery. No patients symptoms worsened after surgery. In these patients, no obvious findings could be deduced in either endoscopic or CT examination. These patients were kept in followup as we believed FESS was adequately performed and no further surgery was offered.

DISCUSSION

FESS has now become gold standard for treatment of chronic rhinosinusitis (CRS), with or without nasal polyposis, not responding to appropriate medical treatment.^{2,8,9}

The primary aim of the surgery should be complete removal of pathology and restoration of physiological functions without distorting anatomy.^{2,8} The study group consisted of 100 patients with chronic sinonasal diseases with or without nasal polyposis, in which conservative management had failed.

In our study there are 58% of male patients and rest 42 % female patients. In the study of Lee *et al.*^{11,12} (1984), there was a male predominance with 75% of the patients being male. Gender has not been found to be predictive of Quality of Life or Endoscopic Sinus Surgery outcome.^{2,3}

In this study, the age group of patient varied from 18 years to 60 years, but maximum number of patients belonged to the age group between 20-29 years. In present study mean age of patient is 35.4 ± 11.2 yrs. So rhinosinusitis affect the Quality of Life of patients in their productive phase of life causing significant stress and morbidity.

Major symptoms seen in our study was nasal obstruction in 83%, nasal discharge 69% which is consistent with a study of 60 cases, by Mustafa Golan *et al.*¹³ (2011), Dufor *et al.*¹⁴ (2004).

Diagnostic nasal endoscopy plays an important role in the decision

making process and for clinical diagnosis and is a mandatory investigation in all patients of rhinosinusitis. It helps to identify the anatomical variations, to know the site of origin, etiology and extent of the disease.¹⁰

All 100 patients underwent CT scan to delineate the location, extent and severity of disease and to define any anatomic variants that may predispose the disease or may lead to complication during surgery. Coronal scans are preferred because anatomy and pathology are examined in a plane most identical to that approached by the endoscopic surgeon.^{2,9,16}

Osteomeatal complex block was noted in 55% cases in our study which is comparable to a study by Neto *et al.*¹⁵, who reported 65% cases of block in the osteomeatal complex. The concept of OMC developed by Stammberger *et al.*¹⁷ was adopted after studies of 200 patients, defining osteomeatal complex as a functional unit representing the final common channel for ventilation and drainage of the maxillary, frontal and anterior ethmoid cells.

Functional endoscopic sinus surgery does not guarantee surgery free from complications. Risks associated with endoscopic sinus surgery are as bleeding, synechiae formation, orbital injury, diplopia, orbital hematoma, blindness, CSF leak, direct brain injury and nasolacrimal duct injury/epiphora. However, Endoscopic sinus surgery can be considered as safe surgery with a rate of 0.5–1% of severe and 5–7% of light complications when performed by surgeons experienced in anatomy and technique of surgery.¹⁸ In our study, profuse intraoperative bleeding was seen in 4 patients due to either high blood pressure or extensive disease or injury to posterior end of turbinate which was cauterized and packing with cotton petty soaked in 1:1000 adrenaline. Two patients developed periorbital swelling post-operatively which resolved eventually.

The patients were strictly called for the post operative examination, nasal endoscopy and cleaning. Excellent post-operative care is essential to a good outcome of endoscopic sinus surgery and can prevent the need for revision surgery. Clinically, the nose takes about 6 weeks for adequate epithelization to cover the mucosal denuded areas and the mucosa looks normal at around 3 months. However, normal physiological function may take longer to return to normal.^{2,8,9}

The efficacy of FESS has been established by studies by Chopra H. *et al.* (2006)¹⁹ and Venkatraman V *et al.* (2013)¹⁵ in CRS patients. Out of 100 patients, we observed that 83% to 96% postoperative improvement after FESS. So in presented study majority of patients reported significant improvement in quality of life after FESS for CRS. The Quality of life assessment was subjective and no objective tool was used.

CONCLUSION

Functional endoscopic sinus surgery has revolutionized the management and outcome of diseases of the nose and paranasal sinuses. Maintenance of anatomical structures and physiological function is the primary motive of FESS. The degree of the disease in each case determines the extent of surgery. Clinical examination, diagnostic nasal endoscopy and CT scan of nose and PNS are most important for preoperative evaluation of patients with sinonasal diseases. Prognosis of FESS depends upon skill and accuracy of the surgeon. Minor complications were reported and were dealt easily during postoperative follow up. However, frequent postoperative cavity toilet and regular follow-up are necessary for good functional results. Functional endoscopic sinus surgery done in patients with chronic rhinosinusitis significantly improve disease-specific Quality of Life of patient.

Compliance with Ethical Standards

Conflict Of Interest There is no conflict of interest in the study

Ethical Approval This article does not contain any studies which experiments with human participants or animals and all institutional and international ethical standards have been followed.

Informed Consent Informed consent was obtained from all individual participants included.

Funding Information There is no funding information in this study

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